Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing

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ABSTRACT

Background Despite considerable federal investment, graduate medical education financing is neither transparent for estimating residency training costs nor accountable for effectively producing a physician workforce that matches the nation's health care needs. The Teaching Health Center Graduate Medical Education (THCGME) program's authorization in 2010 provided an opportunity to establish a more transparent financing mechanism.

Objective We developed a standardized methodology for quantifying the necessary investment to train primary care physicians in high-need communities.

Methods The THCGME Costing Instrument was designed utilizing guidance from site visits, financial documentation, and expert review. It collects educational outlays, patient service expenses and revenues from residents' ambulatory and inpatient care, and payer mix. The instrument was fielded from April to November 2015 in 43 THCGME-funded residency programs of varying specialties and organizational structures.

Results Of the 43 programs, 36 programs (84%) submitted THCGME Costing Instruments. The THCGME Costing Instrument collected standardized, detailed cost data on residency labor (n = 36), administration and educational outlays (n = 33), ambulatory care visits and payer mix (n = 30), patient service expenses (n = 26), and revenues generated by residents (n = 26), in contrast to Medicare cost reports, which include only costs incurred by residency programs.

Conclusions The THCGME Costing Instrument provides a model for calculating evidence-based costs and revenues of community-based residency programs, and it enhances accountability by offering an approach that estimates residency costs and revenues in a range of settings. The instrument may have feasibility and utility for application in other residency training settings.

Introduction

A landmark 2014 Institute of Medicine report[1] on US graduate medical education (GME) reported that GME financing lacks transparency for estimating residency training costs or accountability for producing a physician workforce that matches the nation's health care needs. The federal government spent more than $10 billion on hospital-based GME in 2016, with Medicare GME payments representing approximately 90% of that total (TABLE 1).[2] Yet Medicare GME payments are not based on standardized, comprehensive cost data from teaching hospitals.[3] Medicare payments fall into 2 major categories: direct graduate medical education (DGME) and indirect medical education (IME). DGME payments, which compensate teaching hospitals with Medicare patients for labor costs and educational activities, are tied to the average cost of a hospital's initial years of operating a training program. However, for most hospitals, DGME payments use a formula based on cost data reported by hospitals for the year 1984.[1,3] Even with adjustments for cost of living, payments bear little resemblance to current GME costs incurred by hospitals.[1] IME payments—which teaching hospitals receive as an enhancement to their Medicare per-case discharge rates—compensate teaching hospitals for some of the inherent inefficiencies of their operations and the additional capacity and services they offer, irrespective of the actual educational costs associated with running a residency.[4]

Amid ongoing challenges of transparency and accountability in Medicare GME financing, the Teaching Health Center Graduate Medical Education (THCGME) program was established in 2010

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Editor's Note: The online version of this article contains a table of select characteristics of the 36 Teaching Health Center Graduate Medical Education residencies that submitted costing instruments.

through the Affordable Care Act (ACA) to support primary care training in community-based settings; it provided an opportunity to systematically collect data on the cost of residency training in these sites.[5] Details of the THCGME program have been described in other publications.[6–8] Unlike Medicare GME payments, THCGME payments were designed to support resident training in underserved and rural communities irrespective of the insurance or payer status of patients at the training site.[9] Under ACA provisions, the US Secretary of Health and Human Services initially set the annual per-resident THCGME payment at $150,000, an interim amount based on expert opinion that would be adjusted following an analysis of THCGME residency training costs.[5]

This cost analysis, part of a 5-year evaluation of the THCGME program, represents the first government-sponsored, systematic data collection effort to standardize expenses and revenues associated with training a primary care resident.[1,3] This article describes the methodology for quantifying these costs and revenues, which provides a mechanism for achieving greater transparency in federal GME investments.

What was known and gap
There is a need for valid methods and tools to assess the actual costs of operating a graduate medical education program.

What is new
A cost-reporting tool designed for Teaching Health Center Graduate Medical Education (THCGME)–funded primary care residency programs.

Limitations
Smaller size and relative newness of THCGME programs may limit generalizability.

Bottom line
The THCGME reporting tool may have utility for other programs in assessing their current net training and operational costs.

Methods

Context of the THCGME Cost Analysis

The THCGME program supports accredited training programs through direct funding of community-based organizations serving as residency sponsors. Hospital and university-sponsored residencies are ineligible for THCGME funding.[7] Current teaching health centers include Federally Qualified Health Centers, consortia of community-based sites, behavioral health clinics, dental clinics, Area Health Education Center organizations, and tribal health authorities. As of May 2017, THCGME funded 59 residency programs; of these, 42 began operations with THCGME funding and 17 preexisting programs expanded their program cohorts to include additional THCGME slots.[10] THCGME funds supported 37 family medicine, 8 internal medicine, 4 psychiatry, 3 dentistry, 3 obstetrics and gynecology, 3 pediatrics, and 1 geriatrics primary care residencies in academic year 2016–2017.[7]

Designing the THCGME Costing Instrument

We designed the THCGME Costing Instrument to capture the full range of training expenses regardless of how programs categorize them within their own organizational structure. The tool collects data on residency expenses, residents' ambulatory and inpatient care, payer mix, and residents' patient service expenses and revenues (FIGURE).[1,11] Its design is based on a review of THCGME applications, site visits to selected programs, and discussions with finance experts. To capture the most complete financial picture possible, the instrument collected in-kind residency expenses, which are necessary to operate a residency program but are paid for or donated by another entity. The instrument also includes residents' patient service revenue, which experts consider a more accurate approach to approximating the financial burden of residency programs on sponsoring institutions.[1]

The THCGME Costing Instrument placed an additional reporting burden on busy training programs. For this reason, we relied whenever possible on financial, programmatic, and operational information already being reported for accreditation or other grant-related purposes.

Fielding the Instrument

The THCGME Costing Instrument was fielded from April to November 2015 in 43 teaching health center (THC) residency programs that operated during academic year 2013–2014, following 2 technical assistance webinars that provided information on the instrument and a forum for questions. Follow-up calls with individual programs helped clarify data requirements and ensure consistent interpretation of data requests across residency programs. Data were analyzed using STATA version 13 statistical software (StataCorp LLP, College Station, TX).

The cost analysis was conducted by The George Washington University under contract with the Health Resources and Services Administration (HRSA) and was approved by the Office of Management and Budget following public review and comment.[12–14] The analysis was deemed exempt from review by The George Washington University Institutional Review Board.

TABLE 1
Comparison of Medicare and Teaching Health Center Graduate Medical Education (THCGME) Financing

Item	Medicare GME	THCGME
Statutory authority[a]	Funds a portion of training costs for residents who care for Medicare-covered beneficiaries Established in 1965 as part of Medicare GME payments are an entitlement	Funds training costs for residents regardless of patient coverage Established in 2010 as an innovation in GME in ACA No stable funding appropriation
Estimated annual federal appropriations[b]	$9.7 billion: ■ DGME: $2.6 billion ■ IME: $6.8 billion	$0.1265 billion
GME payment[c]	Total Medicare GME payments vary by teaching hospital: ■ DGME payments are the product of (1) allowable weighted resident FTE; (2) PRA (a geography- and inflation-adjusted dollar amount based on average initial years of operation); and (3) ratio of Medicare to total inpatient bed days ■ IME payments are an enhancement to DRG hospital payment rates	An interim per-resident payment initially set at $150,000 Per-resident payment was lowered to $95,000 as part of the 2015 MACRA legislation
Site of residency training[d]	Geography/patient populations of teaching hospitals (n = 1031): ■ 80% (825) are urban and eligible for Medicaid DSH ■ 13% (139) are urban and not eligible for Medicaid DSH ■ 6% (53) are rural Medical care at teaching hospitals as percentage of estimated annual federal appropriations[b]: ■ $9.6 billion acute care ■ $0.1 billion specialty ■ Less than $0.1 billion community hospitals and ambulatory care	Geography/patient populations for the training sites of the (59) THC grantees: ■ 55% are in medically underserved communities[e] ■ 21% are rural[e] ■ 17% are National Health Service Corps–approved sites[f] Teaching health centers (n = 59) sponsorship[g]: ■ 76% (45) FQHC or look-alike ■ 12% (13) consortium/community-based entity ■ 5% (3) Rural Health Center ■ 3% (2) Native American health authority ■ 2% (1) Area Health Education Center ■ 2% (1) Community Mental Health Center
Workforce supported[d]	Supports all physician specialties based on "caps" set per the Balanced Budget Act of 1997 Primary care specialties are given more weight than non–primary care specialties	Funds only family medicine, internal medicine, pediatrics, obstetrics and gynecology, psychiatry, geriatrics, and general and pediatric dentistry
Outcomes monitoring[b]	CMS regularly audits hospital cost reports for residents' FTE allocation, approved clinical rotations, and approved programs	HRSA uses performance measures and other means to track physician workforce outcomes from these programs

Abbreviations: GME, graduate medical education; ACA, Affordable Care Act; DGME, direct graduate medical education; IME, indirect medical education; FTE, full-time equivalent; PRA, per-resident amount; DRG, diagnosis-related group; MACRA, Medicare Access and Children's Health Insurance Reauthorization Act; DSH, disproportionate share hospital; THC, teaching health center; FQHC, Federally Qualified Health Center; CMS, Centers for Medicare and Medicaid Services; HRSA, Health Resources and Services Administration.

[a] Data for Medicare statutory authority come from Heisler et al[3] and Durfey et al.[9]

[b] Data for Medicare GME come from the National Academy of Medicine, and data for THCGME refer to 2018 and 2019 federal appropriations.[1,15]

[c] Data for GME payments for Medicare are from the National Academy of Medicine[1] and information for THCGME is from the ACA and MACRA.[5]

[d] Data for Medicare teaching hospitals are from the Federal Register[16]

[e] Data from HRSA and percentages presented here are rounded to the nearest whole percentage point.[8]

[f] Data refer to 28 of 164 THC practice sites operating in academic years 2014–2015 and 2015–2016 that were collected as part of the Evaluation and Initial Assessment of HRSA Teaching Health Centers and that were positively identified as NHSC-approved sites in the HRSA Data Warehouse.[17]

[g] Sponsorship information is based on THC program's applications for funding, program survey data for THC programs operating in academic years 2014–2015 and 2015–2016 collected as part of the Evaluation and Initial Assessment of HRSA Teaching Health Centers contract, and from US Department of Health and Human Services.[18]

RESIDENCY EXPENSES[a]	**Labor Costs** Salaries, stipends, and fringe benefits for graduate medical education (GME) program staff, residents, and faculty Contracts for precepting physicians Educational fees and insurance Malpractice insurance Conference travel and fees Housing License fees Outside tuition (eg, board review, courses, other degree programs) **Educational Materials** Simulation equipment Software Textbooks **Program Administration** Overhead for clinical and nonclinical space GME accreditation fees Credentialing Faculty development Resident recruitment costs Orientation programs Retreats and graduation
AMBULATORY AND INPATIENT VISITS & PAYER MIX	**Ambulatory Visits** Total visits Faculty precepted resident visits by postgraduate year **Inpatient Visits** Total visits Faculty precepted resident visits by postgraduate year **Payer Mix**[b] Share of patient visits covered by public and private payers Share of patient visits that were charity care Share of self-paid visits
RESIDENTS' AMBULATORY AND INPATIENT SITES EXPENSES & REVENUES	**Labor Costs** Administration personnel salaries and fringe benefits Purchased administrative services Administration Information technology infrastructure Overhead for ambulatory patient service site(s) Occupancy for ambulatory patient service site(s) **Licensing and Fees for Ambulatory Patient Service Site(s)** Licensing fees Malpractice insurance Electronic health records licensing and maintenance **Revenues** Public and private payers Charity care Self-pay Federally Qualified Health Center grants and other ambulatory patient service grants

FIGURE

Data Captured in the Teaching Health Center Graduate Medical Education Costing Instrument

[a] Except for resident recruitment costs, orientation programs, retreats, and graduation, which are disallowed from Medicare direct graduate medical education payments, residency expenses in table align with the Institute of Medicine report.[1]

[b] Programs reported payer mix using the categories in the Uniform Data System.[11]

Results

THCGME Costing Instrument Submissions

Of 43 residency programs, 36 submitted THCGME Costing Instrument data, yielding an 84% response rate (descriptive characteristics of these programs are provided as online supplemental material). Respondent programs varied by stage of operation and accredited class size. Most had 9 or fewer residents per class, and the majority (26) were startup programs leveraging THCGME funding. Most (24) were family medicine residencies, 4 were internal medicine residencies, and there were 2 programs each in dentistry, obstetrics and gynecology, pediatrics, and psychiatry.

Data Completeness

Table 2 provides a snapshot of data completeness across the 36 submissions. Most residencies were able to report on all or nearly all items in the THCGME Costing Instrument. For residency expenses and inpatient visits and expenses, lack of response indicated the expense was not incurred. In contrast, for ambulatory visits and expenses, lack of response was indicative of reporting difficulty.

Residency Costs: All 36 programs reported labor costs, consisting of salaries, stipends, and fringe benefits for GME program staff, residents, and faculty. Thirty-four residencies reported educational fees and insurance expenses, with most (31) reporting costs of licensing fees and examinations, board certification preparation, and/or board examinations. Only 16 programs reported malpractice insurance expenses, likely reflecting Federally Qualified Health Center receipt of medical liability protection through the Federal Tort Claims Act.[19] All but 2 programs reported paying for travel to conferences and courses associated with residency training. Thirty-three reported program administration expenses, although residencies differed in how they reported expenses in certain categories. For example, 22 reported occupancy (rent or occupancy fees specifically charged to the residency program for residency program space, including faculty offices, coordinator office, and resident space) as a program expense, 2 reported occupancy as an in-kind expense, and 9 reported information on residency program square footage and cost per square foot, which were used to calculate occupancy. In contrast, the 33 programs reporting expenses for educational materials did so fairly consistently.

Ambulatory and Inpatient Care Delivered and Payer Mix: Of the 36 submissions, 30 programs reported total and precepted visits for residents' ambulatory care as well as ambulatory visits by payer category. Eleven programs reported both total and precepted visits for residents' inpatient service; an additional 6 programs reported total inpatient visits only.

Ambulatory and Inpatient Site Expenses and Revenues: Of 36 programs, 26 reported expenses associated with administration and operation of their residents' ambulatory patient service site and revenues associated with residents' ambulatory patient service, including revenue from visits and patient service grants. Inpatient expense and revenue reporting was limited: 16 of 36 programs reported revenues and 1 program reported administrative expenses. Reporting of resident-generated revenues is not typically collected in Medicare GME cost reports.

Discussion

The THCGME Costing Instrument provides a transparent, comprehensive approach to estimating the costs of training residents in a community-based setting. It quantifies educational and clinical expenses as well as revenues generated through residents' patient service—successfully collecting information from new and expansion programs in multiple primary care specialties with varying governance structures.

A key attribute of the instrument is its systematic documentation of in-kind expenses, an approach usually excluded from other GME cost estimates. The study team's cost estimate showed that donated goods and services, which include use of facilities by the residency programs and pro bono faculty time, represented 9% of programs' expenses.[10] The data collection process revealed a far greater reliance on donated goods and services by new programs than established ones, with critical support received from local partners with a stake in creating sustainable community-based training programs. Per-resident THCGME funding by HRSA has since been lowered from $150,000 at the time of the study's data collection to its current level of $95,000, which may prove challenging for THCs that operate in underserved communities with limited resources for shoring up budgetary shortfalls. Uncertainty in general, and lower funding levels in particular, have the potential to discourage participating clinics from continuing resident recruitment, jeopardizing each program's future.[20] The study team documented the numeric findings of this costing study at $157,000 per resident per year, generally confirming HRSA's original cost estimate of $150,000 per resident.[10] This suggests that THCGME funding was in line with actual training costs; the original level of funding may be

TABLE 2
Expense and Revenue Data Collected by the Teaching Health Center Graduate Medical Education Costing Instrument

Costing Instrument Category	No. of Programs Reporting
Residency expenses	36
Labor costs	36
Salaries, stipends, and benefits for GME program staff, residents, and faculty	36
Contracts for precepting physicians	27
Educational fees and insurance	34
Malpractice insurance	16
Conference travel and fees	34
Licensing fees	31
Housing	4
Educational materials	33
Simulation equipment	6
IT software, laptops, e-mail service for residents	33
Textbooks, library resources, journal subscriptions	31
Program administration	33
Overhead for clinical and nonclinical space	33
GME accreditation fees and credentialing	25
Faculty development	31
Resident recruitment and orientation	26
Graduation	11
Visits	30
Ambulatory care	30
Total visits	30
Faculty precepted resident visits by postgraduate year	30
Inpatient care	17
Total visits	17
Faculty precepted resident visits by postgraduate year	11
Payer mix	30
Share of patient visits covered by public and private payers	30
Share of patient visits that were charity care	14
Share of self-paid visits	24
Residents' patient service expenses and revenues	26
Labor costs	20
Administration personnel salaries and benefits	20
Purchased administrative services	15
Administration	23
IT infrastructure	14
Occupancy for ambulatory care site	23
License and fees for ambulatory patient service site(s)	19
Licensing fees	13
Malpractice insurance	13
Electronic health records licensing and maintenance	19
Revenues	30
Public and private payers	30
Charity care	5
Self-pay	25
Federally Qualified Health Center grants and other patient service grants	13

Abbreviations: GME, graduate medical education; IT, information technology.

essential to maintain or further develop the program. A lack of alignment between GME costs, need, and amount of public funding is a documented criticism of current Medicare GME funding mechanisms.[1]

The THCGME program also directly addresses the nation's increasing shortfall of primary care physicians, prompting recent calls to support continued funding for the program at the higher per resident rate.[9] HRSA projects a national deficit of 23 640 primary care physicians by 2025, with disproportionately higher shortages in rural regions.[21] Sixty percent of the nation's primary care health professional shortage areas are located in nonmetropolitan areas, and rural areas face greater health disparities.[22] Of the THCGME program's 210 graduates from the most recent academic year with available public data (2015–2016), 50% intend to practice in a rural setting and/or medically underserved community (eg, a medically underserved area, health professional shortage area, or serving a medically underserved population).[8] In contrast, only 32% of graduates from traditional primary care training programs intend to pursue primary care practice, and just 14% of US primary care physicians practice in rural areas.[23,24] Whereas Medicare GME funding is unmatched to physician workforce needs, the THCGME program has begun to produce the types of physicians that the nation needs most, where it needs them most, and is well positioned to help diminish the nation's physician workforce gaps.

The study includes information on patient service revenues, which substantially alter the net financial picture of training.[10] Data from the THCGME Costing Instrument showed that the majority of THC residency programs provided services to charity care and/or uninsured patients, which do not result in revenues. This service provision aligns with HRSA's mission and the THCGME program's statutory intention to prioritize care for underserved communities. The costing study allowed THCs to address the question of whether residency increases or reduces their sponsoring institutions' bottom line on a clinic-by-clinic basis. The inclusion of revenue data collection in the costing instrument helps achieve a fuller understanding of net residency training costs than is achieved through typical Medicare cost reporting. The THCGME Costing Instrument study indicated that the majority of THCs were able to report the necessary information systematically and comprehensively.

We worked closely with THCs on their instrument submissions to understand the nuances of their operations and challenges associated with reporting the information we requested. We believe an approach that includes educational expenses, apportioned revenues, and associated clinical costs, whether borne by the THC or provided through in-kind arrangements, accurately reflects the full cost of training a resident in a THC.

This study has several limitations. The instrument was fielded to 43 THCs, not the full THC population; program size was relatively small; the study had a high concentration of family medicine residencies with minimal representation from obstetrics and gynecology, pediatrics, and psychiatry programs; and the data reflect a single academic year, with many programs still in the formative stages.

Because the THCGME Costing Instrument and approach used are publicly available,[25] other community-based residencies, and even hospital-based programs, can replicate or build on this study to develop evidence-based estimates of residency training costs. This work could help lay the foundation for a fiscally accountable, national GME system built on real costs.

Conclusion

The THC costing study entailed comprehensive data collection from community-based residencies of differing specialties, organizational structures, and sizes. The instrument may have feasibility and utility for application in other residency training settings.

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